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(54) Wet suit for scuba divers with improved heat insulation

(57) 1. A wet suit for scuba divers comprising a front portion (2) in the form of two flaps (2a, 2b) that can be opened to permit the suit being put on. The flaps are connected to each other by means of a zip fastener (3). The front portion (2) has associated with it an elastic and impermeable diaphragm (9) that extends in a position corresponding to the front portion (2) and will come to be interposed between the front portion and the diver's body when the suit is worn.

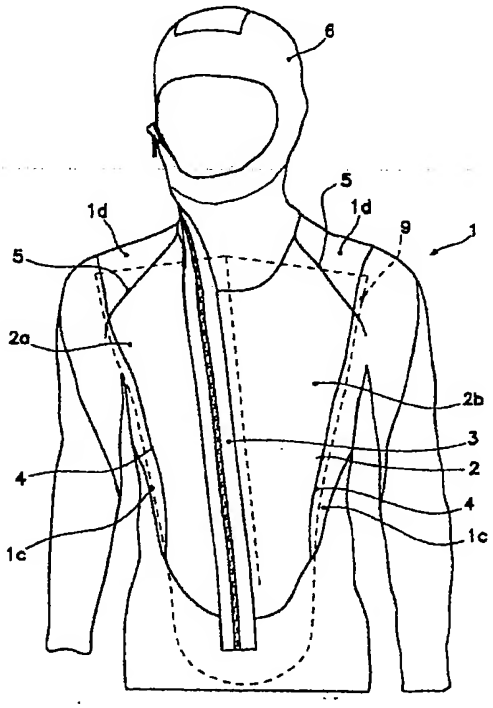

Fig.1

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Description

[0001] The present invention relates to a wet suit for underwater activities.

[0002] It is well known that wet suits for scuba divers are made of such waterproof and heat-insulating materials as neoprene. It is also known that, with exclusion of special uses (i.e. professional use at considerable depth and/or in very cold water and/or for very long periods of time, where the suits used are absolutely waterproof and do not permit the infiltration of water), it is not essential that a diving suit should be absolutely watertight, the water being rather allowed to infiltrate between the body and the suit and to form a film that - due to the effect of the body heat - will rapidly increase in temperature. It is however very important that interchanges between the water contained between the diver's body and the suit and the outside water should be reduced to a minimum. The greater or lesser heat insulation of a diving suit will therefore depend on the presence or absence of appropriate constructional measures intended to hinder or slow down the circulation of the water between the inside and the outside of the suit. Depending on the conditions in which a diving suit is to be used, the measures adopted for this purpose may be more or less efficient and sophisticated and will therefore have different effects on the production cost of the suit.

[0003] One of the channels through which water succeeds in infiltrating particularly readily is constituted by the zip fasteners, especially the front zip (head cowl and breast piece), which is generally the largest zip of the suit and at times also the only one. Notwithstanding the provision of a covering flap extending the entire length of this zip, it is not possible to prevent the infiltration of water through it.

[0004] The object of the present invention is to provide a wet suit for scuba divers in which communication between the outside and the interspace between body and suit will be prevented, thus appreciably limiting the possible water replacement and therefore also heat removal from within the suit.

[0005] Another aim of the present invention is to provide a diving suit of the aforementioned type in which the water that succeeds in infiltrating through the front zip will remain confined in an interspace within the suit and will not therefore come into contact with the diver's body.

[0006] These aims are attained by the wet suit for scuba divers in accordance with the present invention, which comprises a front portion consisting of two flaps that can be opened to permit the suit being put on, said flaps being joined together by means of a zip fastener, and is characterized by the fact that with said front portion there is associated an elastic and impermeable laminar diaphragm of a size sufficient to cover the entire front portion of the suit, so that it will come to be interposed between said front portion and the diver's body when the suit is worn.

[0007] The invention will now be illustrated in greater detail by means of the following description of a particular embodiment thereof, which is to be considered solely as an example and not limitative in any way, said description making reference to the attached drawings of which:

- Figure 1 shows a front view of the upper part of a generic wet suit incorporating the invention,
- Figure 2 shows a detail of the wet suit of Figure 1 when the suit is partly opened, and
- Figure 3 shows the wet suit of Figure 1 when its front portion is completely opened.

[0008] These figures illustrate the upper portion of a generic wet suit for scuba divers, generically indicated by the reference number 1, made of neoprene or some other equivalent material, all in conformity with techniques known to the state of the art, and possessing good properties of wearability and heat absorption. The wet suit 1 has a front portion 2 consisting of two flaps 2a and 2b connected to each other by means of a central zip fastener 3, so that the suit can be put on or taken off when the zip fastener is open. At the level of the hips flaps 2a and 2b extend from the trouser portion of the suit - not shown in the figure - and are connected to the sides 1c of the suit by means of seams 4 and to shoulder pieces 1d of the suit by means of seams 5.

[0009] The suit also comprises a head cowl 6 that extends in the manner of a collar from front portion 2 and shoulder pieces 1d of the suit. Zip fastener 3 extends also along the collar portion of the head cowl, so that the cowl can likewise be completely opened. As shown in Figure 2, inside the suit and in a position corresponding to the portion of zip fastener 3 that extends along the breast piece, there is provided a lining flap 7 that completely covers the zip fastener. This flap is sewn to the part 2a or 2b of the front portion of the suit. Inside head cowl 6 and in a position corresponding to its collar portion there is provided another lining flap 8 that is likewise intended to limit water infiltrations through the facial part of the zip fastener.

[0010] According to the invention, as shown in Figure 3, inside the suit and in a position corresponding to front portion 2 there is provided an elastic laminar diaphragm 9, advantageously made of neoprene or some other equivalent material, that is connected to the suit more or less in the positions of seams 4, while it has a free upper edge 9a at the level of the shoulders and the neck.

[0011] More particularly, diaphragm 9 is connected to the inside of suit 1 by means of a glued joint 11 and sewn internally by means of a waterproof seam.

[0012] Diaphragm 9 is extremely soft and flexible, so that the suit can be put on without difficulty and will adhere to the diver's breast. With a view to making it even easier to put on the suit in accordance with the invention, diaphragm 9 can be advantageously provided with a zip

fastener 10 extending a significant length from free edge 9a of the diaphragm. The thermal efficiency of the suit in accordance with the invention is only minimally reduced by the presence of zip fastener 10, because zip fastener 10 will be screened by the upper parts of flaps 2a and 2b as soon as they are connected to each other. Alternatively, the place of the zip fastener could be taken by a Velcro-type fastening. Zip 3 could likewise be replaced by such a fastening.

[0013] Thanks to the present invention, the water that passes through zip fastener 3 will no longer come into direct contact with the diver's body, but remains confined in an inner space of the suit comprised between diaphragm 9 and flaps 2a and 2b of the front portion of the suit.

[0014] In actual practice the present invention could be applied to any diving suit model with a front zip fastener with or without a head cowl and could be realized in any impermeable and insulating material. The invention is therefore not limited to the embodiment described hereinabove, but comprises all variants as set forth in the appended claims.

Claims

1. A wet suit for scuba divers comprising a front portion (2) in the form of two flaps (2a, 2b) that can be opened to permit the suit being put on, said flaps being connected to each other by means of a zip fastener (3), **characterized in that** said front portion (2) has associated with it an elastic and impermeable diaphragm (9) that extends in a position corresponding to said front portion (2) and will come to be interposed between said front portion and the diver's body when the suit is worn.

2. A wet suit for scuba divers in accordance with claim 1, wherein said diaphragm (9) is fixed to said flaps in the position in which they are joined to the side parts (1c) of said suit and has a free upper edge (9a).

3. A wet suit for scuba divers in accordance with claim 1 or claim 2, wherein said diaphragm (9) has a portion that can be opened in order to make it easier for the suit to be put on.

4. A wet suit for scuba divers in accordance with anyone of the preceding claims comprising a head cowl (6), said zip fastener (3) extending along a collar portion thereof, and lining flaps in the interior of the suit in a position corresponding to said zip fastener.

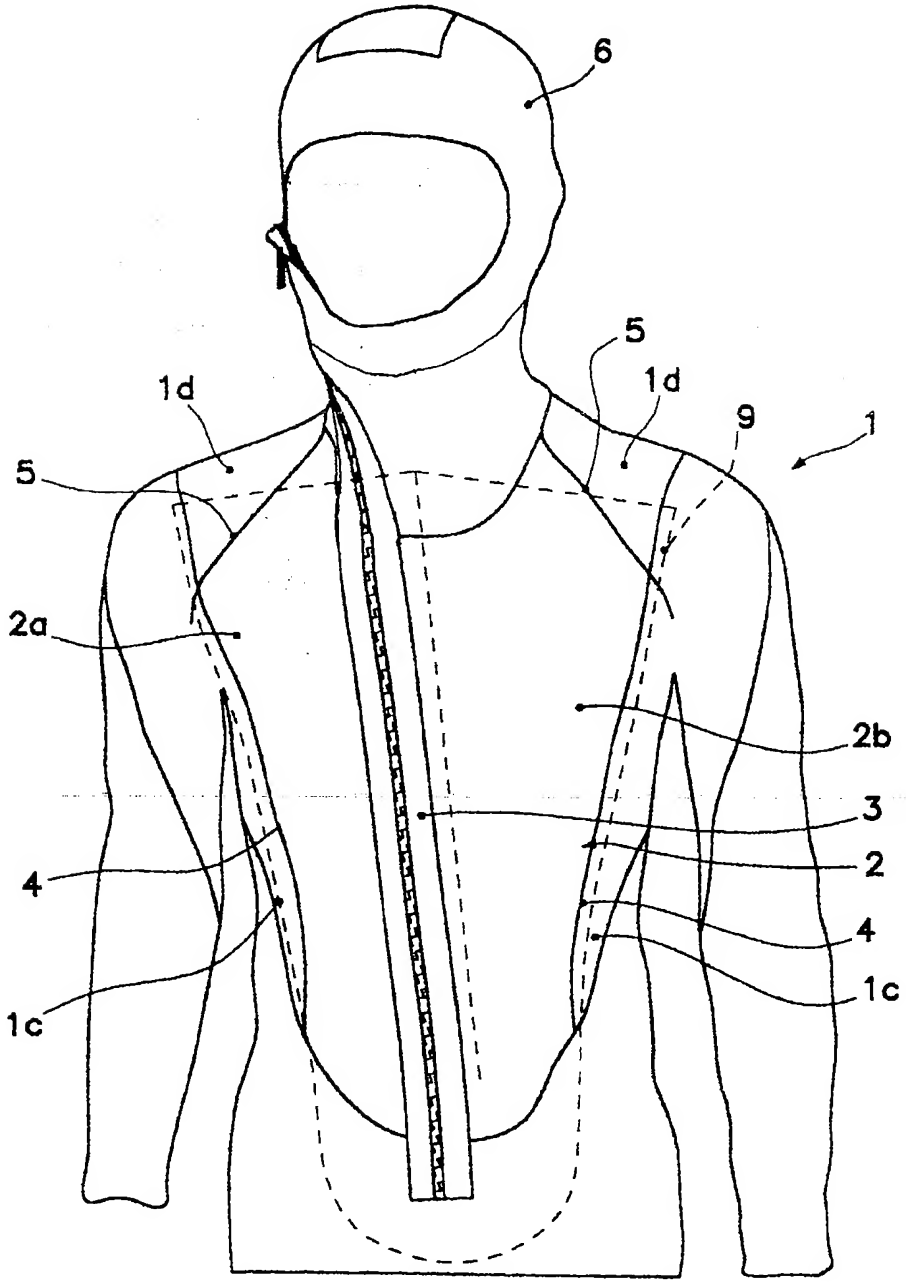

Fig.1

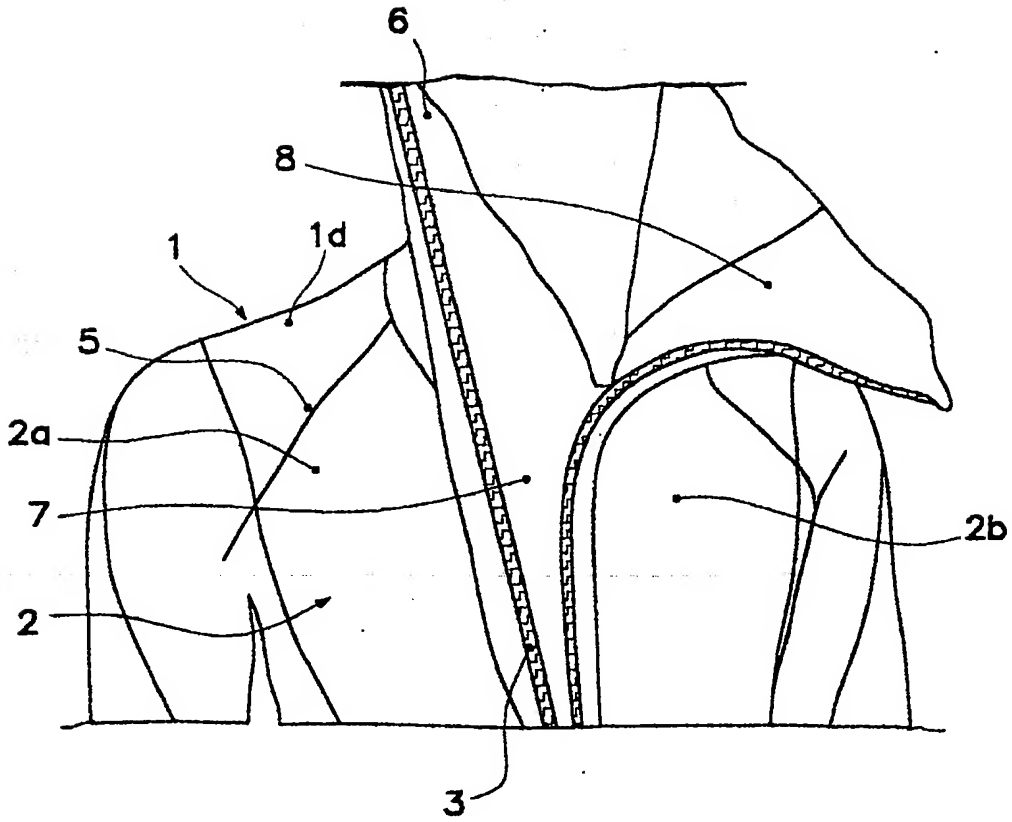

Fig.2

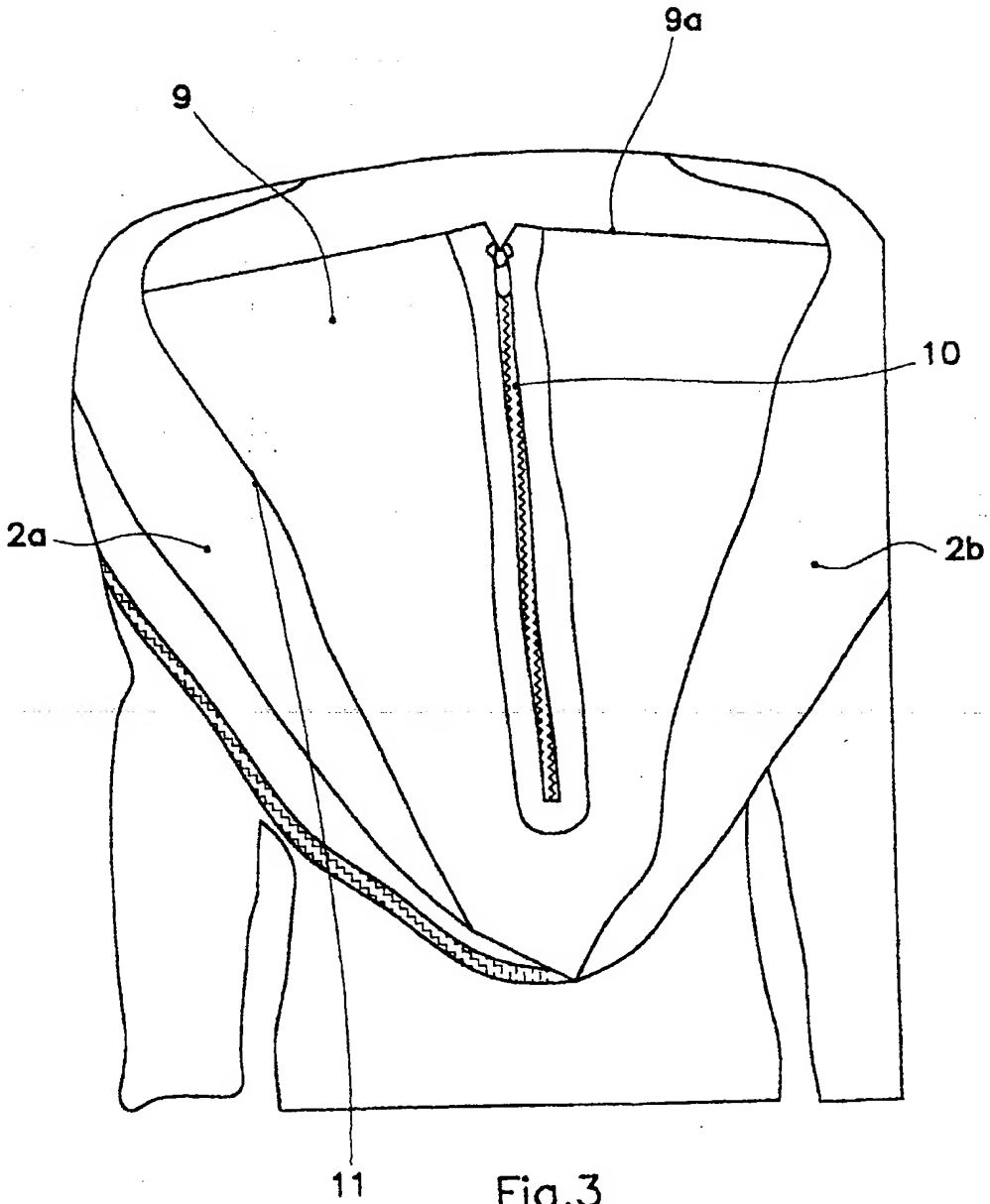

Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5451

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	WO 99 52765 A (NEILL INC O) 21 October 1999 (1999-10-21) * page 4, line 25 - line 29 * * page 6, line 3 - line 13; figures 3,4,9 * ---	1-4	B63C11/04
Y	CH 665 184 A (PETER BAMERT) 29 April 1988 (1988-04-29) * abstract; figures * ---	1-4	
Y	DE 296 20 991 U (BELUGA TAUCHSPORT GMBH) 27 February 1997 (1997-02-27) * figures * ---	1-4	
A	FR 864 502 A (MORNER HANS GEORG) 29 April 1941 (1941-04-29) * page 2, line 65 - line 104; figures * -----	1-4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	18 October 2002	Moya, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 42 5451

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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18-10-2002

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82